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10/584,838

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EXAMINER

GREEN, YARA B

ART UNIT

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2884

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12/02/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 10/584,838 | Applicant(s) SHIRAKAWA ET AL. | |
| | Examiner YARA B. GREEN | Art Unit 2884 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4 and 8-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4 and 8-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to Applicant's Amendment filed August 1, 2008. Claims 1, 8 and 8 have been amended. Claims 2 and 5-7 have been cancelled. Claims 10-14 have been added. Currently, claims 1, 3-4, and 8-14 are pending.

Response to Amendment

1. Applicant's labeling of the Figure 1 as prior overcomes the objection set forth in paragraph 1 of the previous Office Action.
2. Applicant's amendment to the specification successfully overcomes the objection set forth in paragraph 2 of the previous Office Action.
3. Applicant's cancellation of claim 2 renders moot the objection set forth in paragraph 3 of the previous Office Action.
4. Applicant's amendment of claim 8 successfully overcomes the rejection under 35 USC 112, 2nd paragraph, as set forth in paragraph 6 of the previous Office Action.
5. Applicant's amendment of claim 8 successfully overcomes the rejection under 35 USC 101, as set forth in paragraph 7 of the previous Office Action.

Response to Arguments

6. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

Art Unit: 2884

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. **Claims 1, 3-4, and 8-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown (US Patent No. 3,581,090; published May 25, 1971) in view of Ito et al. (US Patent No. 5,118,948; published January 2, 1992) and Zelakiewicz et al. (US PreGrant Pub. 2006/0065844; filed September 30, 2004).

Re **claims 1 and 9**, Brown discloses a direction finding radiation detector for detecting a direction of incidence of radioactive rays, the detector comprising:

a plurality of scintillators **23,24,25** made of the same material, being arranged to overlap circumferentially at least in part so that they are shadowed by each other from radioactive rays incident in circumferential directions and so that light emitted from one of the scintillators is not incident on the other scintillators (col. 4, lines 42-48; col. 1, lines 36-44); and photoreceptor devices **27** each having a light receiving surface optically coupled to each of the scintillators (col. 4, lines 57-64), wherein

a combination of proportions of radioactive rays incident directly on the respective scintillators and radioactive rays incident indirectly, being shadowed by the other scintillators, varies with the direction of incidence circumferentially (col. 5, lines 68-73; col. 1, lines 35-44).

Brown does teach wherein the scintillators are connected to their respective amplifiers that may have different gains (col. 10, lines 70-75; col. 11, lines 24-28, lines 1-10). Although Brown discloses an analog system, converting and using a digital system is not precluded (col. 16, lines 10-16). In a

Art Unit: 2884

similar field of endeavour, Ito et al. teach a digital processing circuit for output signals from a plurality of gamma ray detectors. Ito et al. disclose wherein analog to digital converters are operationally connected to their respective photodetector devices (col. 5, line 59 - col. 6, lines 10) which, in turn, are connected to a pulse height analyzer (col. 4, lines 45-50).

Ito et al. teach employing A/D converters for each signal line of the detector instead of single A/D converter. However, in a similar field of endeavour, Zelakiewicz et al. teach using a single A/D converter for converting the signals of photodetector array can be configured to process in real-time and therefore would not suffer any delays (para. 0017). One of ordinary skill in the art would have been motivated to use a single A/D converter, as taught by Zelakiewicz et al. in the apparatus Brown, as modified Ito et al., that would still preserve the sampling frequency of the detector.

Ito et al. further teach using a multichannel pulse height analyzer (col. 4, lines 45-51). One of ordinary skill in the art would have been motivated to implement the pulse height analyzer of Ito et al. in the detector of Brown in order to process digital signals and ascertain the energies of the incident radiation.

Re **claim 3**, Brown, as modified by Ito et al. and Zelakiewicz et al., teach the limitations of claim 1, as mentioned above. Brown further teaches wherein the scintillators are three or more in number so that the direction of incidence is detected all around the range of 0-360 degrees (col. 4, lines 45-49).

Re **claim 4**, Brown, as modified by Ito et al. and Zelakiewicz et al., teach the limitations of claim 1, as mentioned above. Brown further teaches wherein the scintillators are formed by splitting a single scintillator in the circumferential direction (col. 4. lines 41-46).

Art Unit: 2884

Re **claim 8**, the method recited requires the structural limitations of claim 1 and is therefore rejected similarly. Brown further teaches the method to measure a circumferential radiation using the direction finding radiation detector (col. 1, lines 35-45).

2. **Claims 10-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown (US Patent No. 3,581,090; published May 25, 1971) in view of Ito et al. (US Patent No. 5,118,948; published January 2, 1992) and Deliwala (US Patent No. 7,339,170; filed July 16, 2003).

Re **claims 10 and 13**, Brown discloses a direction finding radiation detector for detecting a direction of incidence of radioactive rays, the detector comprising:

a plurality of scintillators **23,24,25** made of the same material, being arranged to overlap circumferentially at least in part so that they are shadowed by each other from radioactive rays incident in circumferential directions and so that light emitted from one of the scintillators is not incident on the other scintillators (col. 4, lines 42-48; col. 1, lines 36-44); and photoreceptor devices **27** each having a light receiving surface optically coupled to each of the scintillators (col. 4, lines 57-64), wherein

a combination of proportions of radioactive rays incident directly on the respective scintillators and radioactive rays incident indirectly, being shadowed by the other scintillators, varies with the direction of incidence circumferentially (col. 5, lines 68-73; col. 1, lines 35-44).

Brown does teach wherein the scintillators are connected to their respective amplifiers that may have different gains (col. 10, lines 70-75; col. 11, lines 24-28, lines 1-10). Although Brown discloses an analog system, converting and using a digital system is not precluded (col. 16, lines 10-16). In a similar field of endeavour, Ito et al. teach a digital processing circuit for output signals from a plurality of gamma ray detectors. Ito et al. disclose wherein analog to digital converters are

Art Unit: 2884

operationally connected to their respective photodetector devices (col. 5, line 59 - col. 6, lines 10) which, in turn, are connected to a pulse height analyzer (col. 4, lines 45-50).

Ito et al. further teach employing A/D converters for each signal line of the detector instead of single A/D converter (col. 5, lines 13-20). Ito et al. further teach using a multichannel pulse height analyzer (col. 4, lines 45-51). One of ordinary skill in the art would have been motivated to implement the pulse height analyzer of Ito et al. in the detector of Brown in order to process digital signals and ascertain the energies of the incident radiation.

Ito et al. do not teach wherein the A/D converters have different conversion rates. In a similar field of endeavour of image processing, Deliwala teach implementing A/D converters with different sampling frequencies in order to provide for the dynamic range of the incident radiation (col. 15, lines 11-51). One of ordinary skill in the art would have been motivated to use A/D converters with different sampling frequencies, as taught by Deliwala, in the apparatus of Brown, as modified by Ito et al., in order to provide a large dynamic range for detection.

Re **claim 11**, Brown, as modified by Ito et al. and Deliwala, teach the limitations of claim 10, as mentioned above. Brown further teaches wherein the scintillators are three or more in number so that the direction of incidence is detected all around the range of 0-360 degrees (col. 4, lines 45-49).

Re **claim 12**, Brown, as modified by Ito et al. and Deliwala, teach the limitations of claim 10, as mentioned above. Brown further teaches wherein the scintillators are formed by splitting a single scintillator in the circumferential direction (col. 4, lines 41-46).

Re **claim 14**, the method recited requires the structural limitations of claim 10 and is therefore rejected similarly. Brown further teaches the method to measure a circumferential radiation using the direction finding radiation detector (col. 1, lines 35-45).

Art Unit: 2884

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YARA B. GREEN whose telephone number is (571)270-3035. The examiner can normally be reached on Monday - Thursday, 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2884

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Yara B. Green

/YBG/

/David P. Porta/

Supervisory Patent Examiner, Art Unit 2884